2013-14

Missouri Deer Season Summary & Population Status Report

Missouri Department of Conservation

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2013-14 Overview

The 2013-14 deer harvest of 251,924 was nearly a 19% decrease from 2012-13. This reduction in statewide harvest is a result of long-term decreasing deer populations in central, northern, and western counties and average harvest in southern counties due to an average acorn production year.

Rapid deer population growth in central, northern, and western Missouri occurred during the 1980's, 1990's, and early 2000's required liberalization of harvest regulations to reduce deer populations to socially acceptable levels. These regulation liberalizations coupled with hemorrhagic disease outbreaks in 2007, 2012, and 2013 have resulted in decreasing deer numbers over the past five years. These population declines are indicated through population and hunter survey data. In southern Missouri , however, the 2013-14 deer harvest was a fairly typical reflection of average acorn production and slowly increasing deer populations. This is in spite of the 2012's record low acorn production and hemorrhagic disease outbreak that increased harvest rates and natural mortality, respectively.

The goal of MDC's Deer Program is to achieve and maintain deer populations at desired levels throughout Missouri. We define "desired levels" as the point at which deer populations are both biologically sustainable and socially acceptable to hunters, production landowners, and other interested stakeholders. The Deer Program annually develops regulation recommendations based upon harvest data, hunter and production landowner surveys, MDC staff surveys, public comments, and population simulations. Additionally, a White-tailed Deer Management Plan was drafted in 2014 to provide a long-term strategic plan that includes a series of goals, objectives, and strategies for managing Missouri's deer herd in the future. The Missouri Department of Conservation will implement a public participation plan to engage stakeholders and gain their input during the summer of 2014 regarding Missouri deer management including hunting season structure (e.g., time, methods, limits), deer population levels and trends, and feedback on the strategic plan. This will be the next step in a continual effort to engage and communicate with the public on deer management and regulations topics.

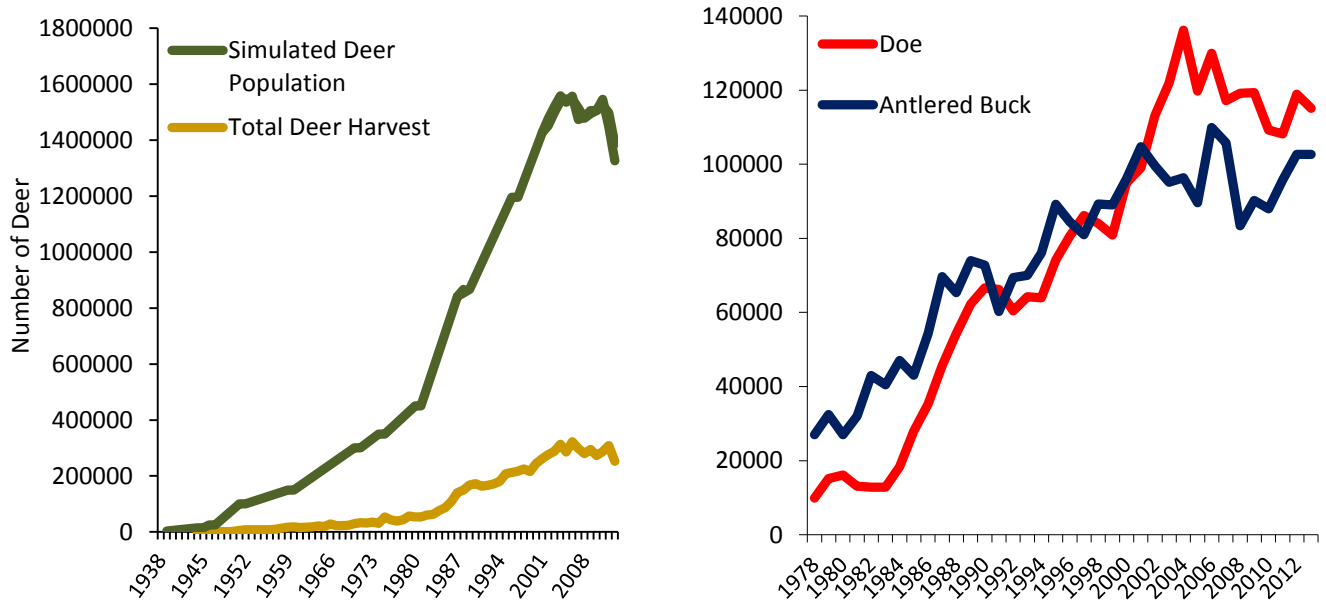


Figure 1. Statewide estimated deer population and total deer harvest from 1938 to 2013 (left). Number of antlered bucks and does in the statewide deer harvest from 1978 to 2013 (right).

Deer Season General Information: 2013-2014

Season Dates:

Archery Season: September 15 through January 15, closed during the November portion of the firearms deer season

Firearms Season:

Urban Portion: October 11 - 14
Youth Portion: November 2 - 3; January 4 - 5
November Portion: November 16 - 26
Antlerless Portion: November 27 - December 8
Alternative Methods Portion: December 21 - 31

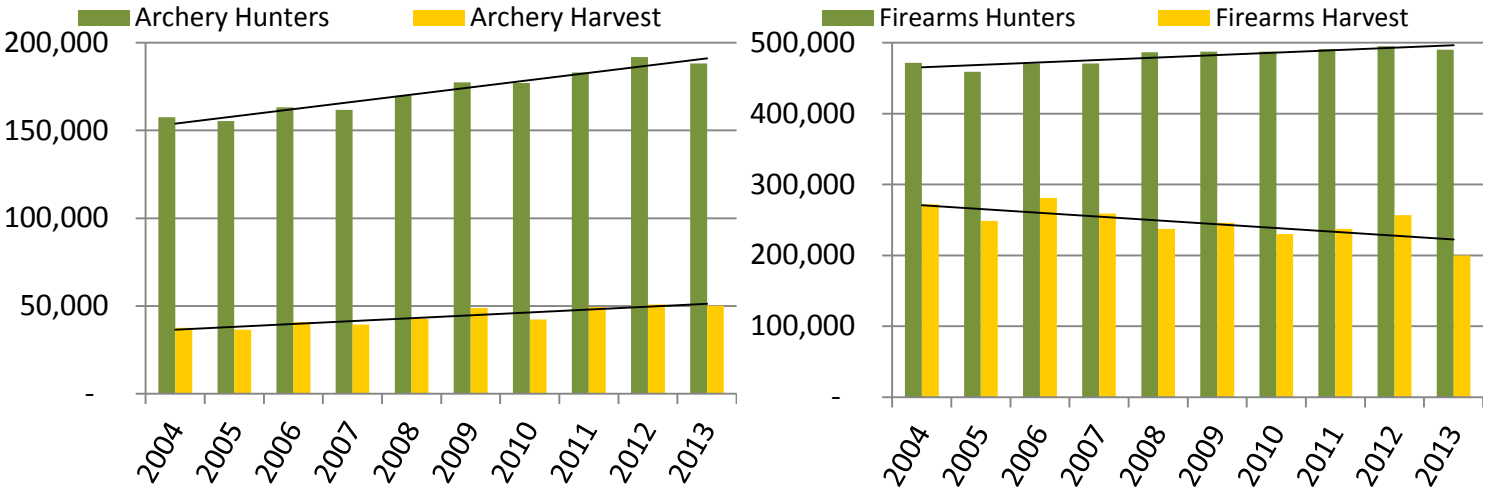


Figure 2. Trends in the number of individuals holding an archery and firearms deer hunting permit and harvest.

Archery Season Summary

The 2013 archery season yielded the second highest archery harvest in Missouri of 50,176 deer, which was a 2% decrease from the 2012. The 2013 harvest included 24,483 does, 5,426 button bucks, and 20,267 antlered bucks (Table 1). Coinciding with the decrease in archery harvest there was a 2% decrease in archery permit sales. The sale of permittee and youth archery antlerless permits decreased by 5% and 9%, respectively compared to 2012 (Table 2). A total of 188,220 individuals possessed an archery permit in 2013 (Table 3). While the number of archers decreased by 2% from 2012 there has been a 19% increase in archery hunting participation over the past ten years.

Firearms Season Summary

Resident firearms hunters obtained 891,779 permits, down 2% from 2012, which is a reflection of a decrease in antlerless permit purchases, but no change in any-deer permit purchases (Table 2). Nonresident firearm permits purchased were similar to 2012 with a total of 29,159 permits issued (Table 2). For the past several years the total number of individuals possessing a firearms deer hunting permit has increased 1% per year, however, in 2013 there was a 1% decrease (Table 3).

Deer harvest during the 2013-14 firearms season totaled 199,959. This was a 22% decrease from 2012-13 (Table 1). The total harvest was made up of 90,568 does, a 24% decrease from 2012; 25,300 button bucks, a 29% decrease; and 84,091 antlered bucks, an 18% decrease. The firearms harvest is composed of 95% resident hunter harvest and 5% non-resident hunter harvest, which has remained consistent for several years (Table 2). When reviewing deer harvest trends it is critical to evaluate on a regional or county level, because statewide harvest numbers do not convey local population; therefore refer to pages 9-13 for regional population trend information.

Harvest during the 2013 urban portion decreased by 45% from 2012, with a total of 605 deer harvested. Harvest during the urban portion is variable with harvest totaling 1,457 in 2009, 586 in 2010, 570 in 2011, and 1,100 in 2012.

Historically weather has greatly influenced harvest during the urban portion, and in 2013 temperatures were in the 70's, likely resulting in decreased participation, thus lower harvest.

In 2013, harvest during the early youth was down 3% from 2012 with a harvest of 18,859 and the late youth harvest was down 47% from 2012 with a harvest of 1,194 deer. The total harvest for both youth portions (early and late combined) consisted of 12,364 antlered bucks, 2,048 button bucks, and 5,641 does, totaling 20,053 deer (Table 1). The reduction in youth harvest is a result of decreased deer populations, but also a reflection of weather conditions during the late youth portion.

The 2013 harvest during the antlerless portion totaled 10,566 deer, which was a 30% decrease from 2012. The decrease in harvest is partially attributed to decreasing deer populations in central, northern, and western Missouri (refer to pages 9-13 for information on regional trends).

Lastly, the 2013 harvest during the alternative methods portion totaled 11,945 deer, which was a 20% decrease from 2012. The alternative methods portion harvest consisted of 2,632 antlered bucks, 1,760 button bucks, and 7,553 does, decreases of 26%, 22%, and 17% from 2012, respectively. This harvest decrease is partially a reflection of regional deer population decreases mentioned previously.

Managed Deer Hunt Summary

Overall, hunters harvested 1,789 deer during the managed deer hunts in 2013, which was 161 fewer or an 8% decrease from 2012. Managed deer harvest totals are annually a reflection of number of hunts and quotas, therefore harvest typically fluctuates with harvests totals being 1,950 in 2012, 1,800 in 2011, and 2,665 in 2010.

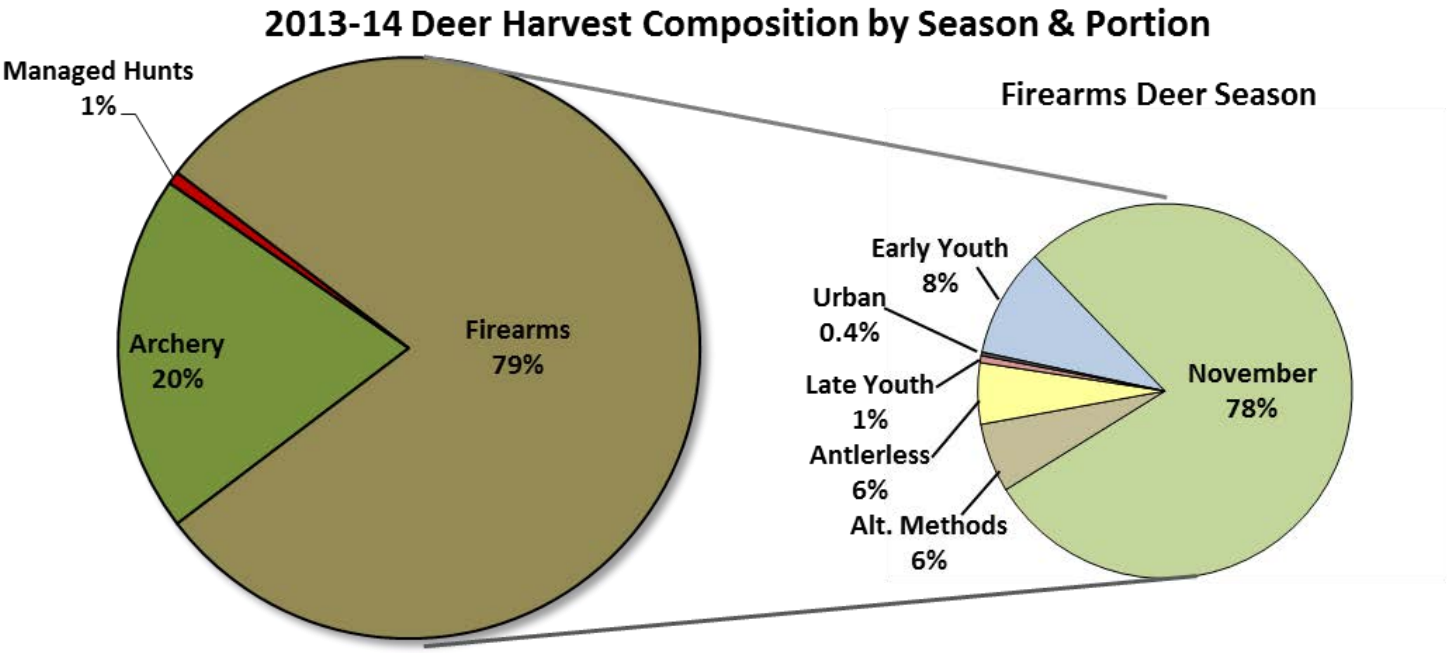


Figure 3. 2013-14 Composition of total deer harvest by seasons and portions of the firearms season.

Table 1. Deer Season Harvest Comparison: 2012 & 2013

Hunting Portion	Antlered Deer			Button Bucks			Does			Total		
	2012	*2013*	*% Diff*	*2012*	*2013*	*% Diff.*	*2012*	*2013*	*% Diff.*	*2012*	*2013*	*% Diff.*
Archery	17,437	20,267	16	6,275	5,426	-14	27,296	24,483	-10	51,008	50,176	-2
Urban	8	1	-88	195	105	-46	907	499	-45	1,110	605	-45
Early Youth	11,308	12,079	7	2,377	1,857	-22	5,806	4,923	-15	19,491	18,859	-3
November	87,039	68,926	-21	27,069	19,496	-28	89,879	68,320	-24	203,987	156,742	-23
Antlerless	149	133	-11	3,217	1,888	-41	11,762	8,545	-27	15,128	10,566	-30
Alt. Methods	3,565	2,632	-26	2,264	1,760	-22	9,107	7,553	-17	14,936	11,945	-20
Managed Hunts	496	457	-8	370	275	-26	1084	1057	-2	1,950	1,789	-8
Late Youth	483	285	-41	385	191	-50	1,365	718	-47	2,233	1,194	-47
CWD Seals*	64	35	-45	6	3	-50	16	10	-38	86	48	-44
Total Firearms	102,616	84,091	-18	35,513	25,300	-29	118,842	90,568	-24	256,971	199,959	-22
Total	120,549	104,815	-13	42,158	31,001	-26	147,222	116,108	-21	309,929	251,924	-19

Table 2. Permit Sales and Harvest by Permit Type

Permit Type	Number of Permits			Number of Deer Harvested		
	2012	*2013*	*% Diff.*	*2012*	*2013*	*% Diff.*
Permittee Archery	109,152	108,366	-1	21,172	22,578	7
Landowner Archery	86,212	85,367	-1	6,707	6,911	3
Youth Archery	7,057	6,791	-4	942	944	0
Permittee Archery Antlerless	52,472	50,079	-5	15,413	13,798	-10
Landowner Archery Antlerless	141,507	139,556	-1	6,227	5,378	-14
Youth Archery Antlerless	2,191	2,001	-9	410	357	-13
Permittee Firearms Any-Deer	293,098	294,550	0	76,655	61,268	-20
Landowner Firearms Any-Deer	181,322	180,880	0	41,908	32,874	-22
Youth Firearms Any-Deer	57,519	57,578	0	20,480	18,767	-8
Permittee Firearms Antlerless	223,111	208,802	-6	78,134	57,954	-26
Landowner Firearms Antlerless	156,174	154,878	-1	30,789	22,922	-26
Youth Firearms Antlerless	25,472	24,249	-5	8,451	6,160	-27
Resident Firearms	907,537	891,779	-2	244,100	189,529	-22
Nonresident Firearms	29,159	29,158	0	12,317	10,416	-15
Resident Archery	388,119	381,549	-2	47,539	46,614	-2
Nonresident Archery	10,472	10,611	1	3,332	3,352	1
Permittee Archery & Firearms	770,072	752,416	-2	221,657	181,826	-18
Landowner Archery & Firearms	565,215	560,681	-1	85,631	68,085	-20

* CWD Management Seals are part of the MDC's management plan to limit the spread of CWD. CWD Seals were distributed to landowners who own 5 acres or more in the CWD Core Area (30 square mile area in Linn and Macon counties), which permit the harvest of one deer of either sex on the specific property for which it was issued.

Table 3. Deer Hunter and Harvest Facts

	Archery	Firearms	Archery & Firearms Combined
Resident permits[1]	107,717	334,878	351,753[3]
Non-resident permits[1]	8,597	19,353	25,628[3]
Landowner permits[1]	85,696	181.913	183,993[3]
Total permittees[2]	188,200	490,116	513,113[3]
Age distribution of hunters:			
10 or younger	1,701	22,333	-
11-15	10,896	50,102	-
16-40	82,766	180,308	-
41 or older	92,837	237,373	-
Antlerless permit sales:			
1	28,223	153,604	181,827
2	7,339	26,773	34,112
3	1,486	4,786	6,272
4 or more	1,001	2,567	3,568
Number of deer taken:			
0	150,239	328,473	329,894[4]
1	29,391	131,203	136,903[4]
2	6,344	24,857	33,531[4]
3	1,513	4,270	8,495[4]
4 or more	713	1,313	4,290[4]
Number of antlered deer taken:			
0	168,554	406,748	408,890[4]
1	19,059	82,773	92,885[4]
2	577	572	5,297[4]
3	10	23	248[4]
Percentage taking:			
1 or more deer	20.1	33.0	35.7[4]
1 deer	15.6	26.8	26.7[4]
2 deer	3.4	5.1	6.5[4]
3 or more deer	1.1	1.1	2.5[4]
Percentage taking:			
1 antlered buck	10.1	16.9	18.1[4]
2 antlered bucks	0.3	0.1	1.0[4]
3 or more antlered bucks	0.005	0.005	0.05[4]
Percentage of deer taken by nonresidents	6.7	5.2	5.5
Percentage of deer taken by landowners	27.9	24.6	27.2

[1] Number of any-deer permits issued
[2] Number of individuals possessing a permit, not number of permits issued
[3] Number of individuals that held an archery and/or firearms permit
[4] Number of individuals that harvested the specified number when combining their archery and firearms harvest

County Harvest Statistics

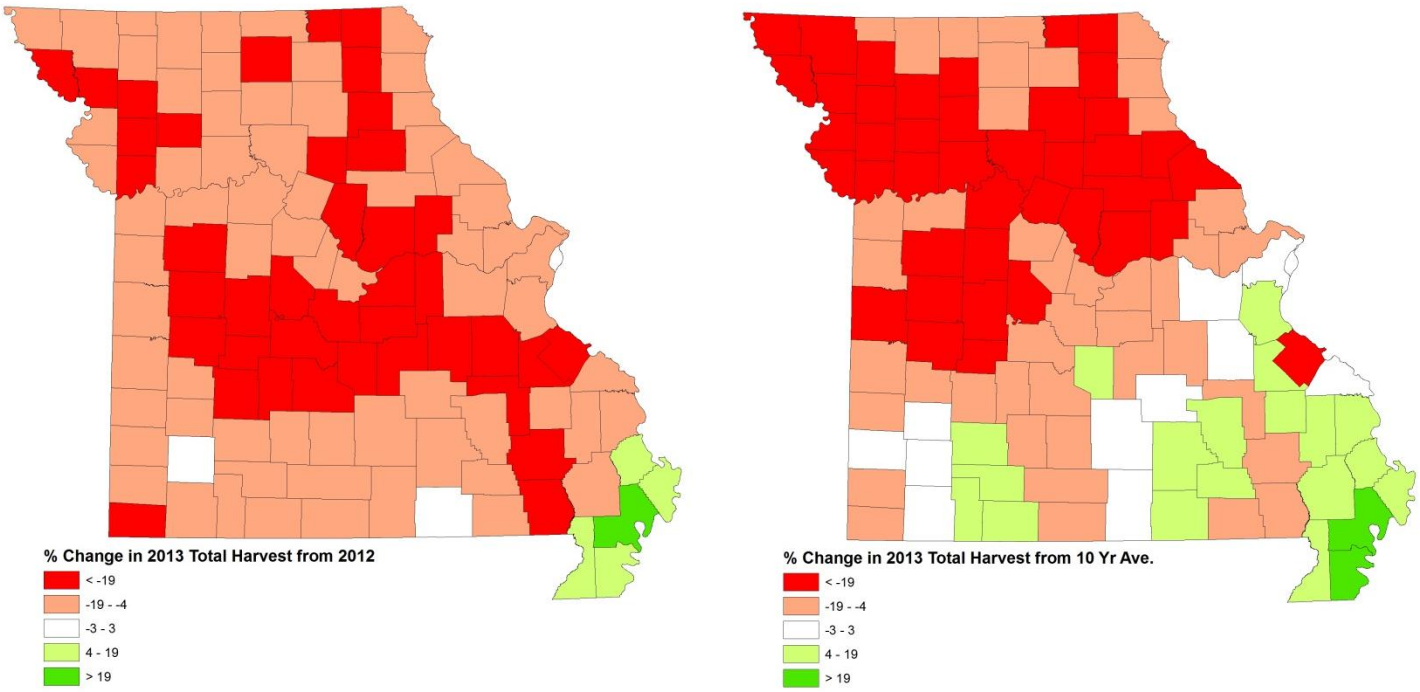


Figure 4. Percent change in total deer harvest from 2012 to 2013 and percent change in 2013 compared to the 10-year average by county with apparent long-term harvest decreases in central, northern, and western Missouri.

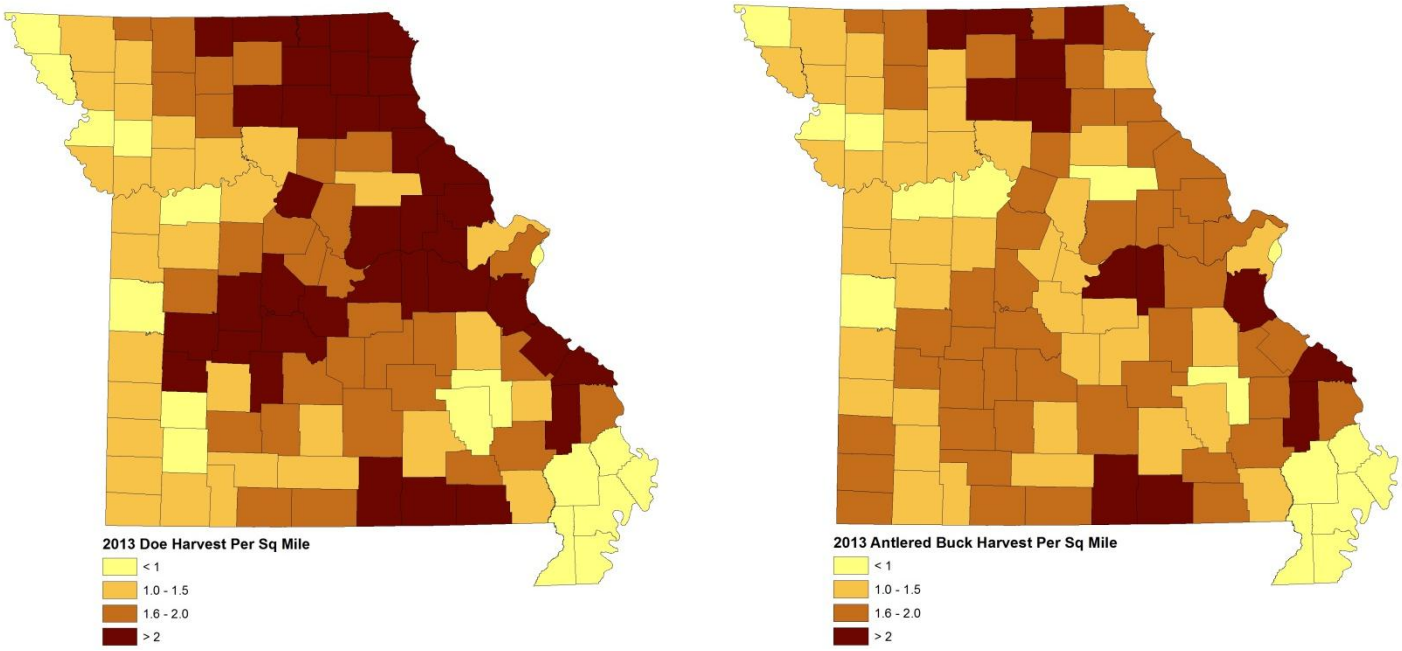


Figure 5. Doe and antlered buck harvest per square mile by county during the 2013 deer season.

Deer Hunter Data

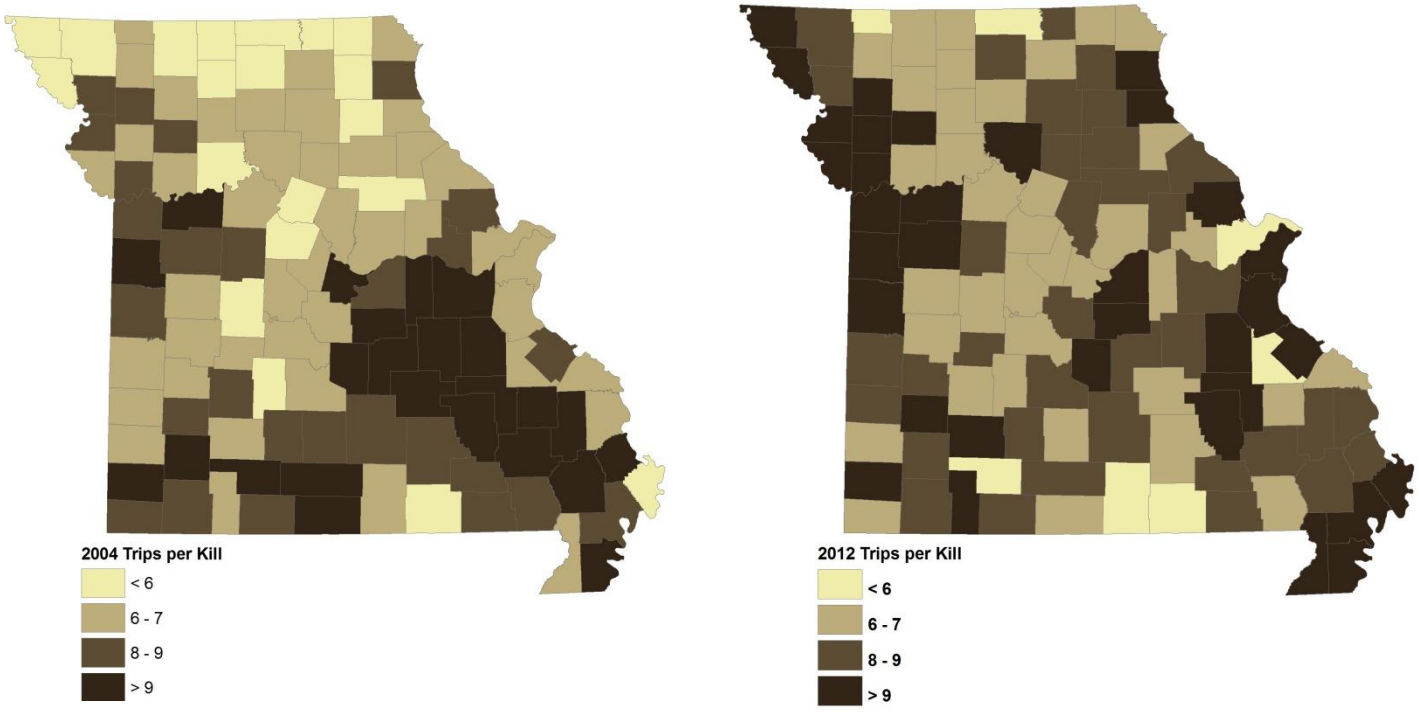


Figure 6. Hunter effort data shown by number of trips per harvested deer from hunter surveys performed in 2004 and 2012. The increase in trips per harvest (as illustrated by the darker gray) in central, northern, and western Missouri coincides with other information indicating decreased deer populations.

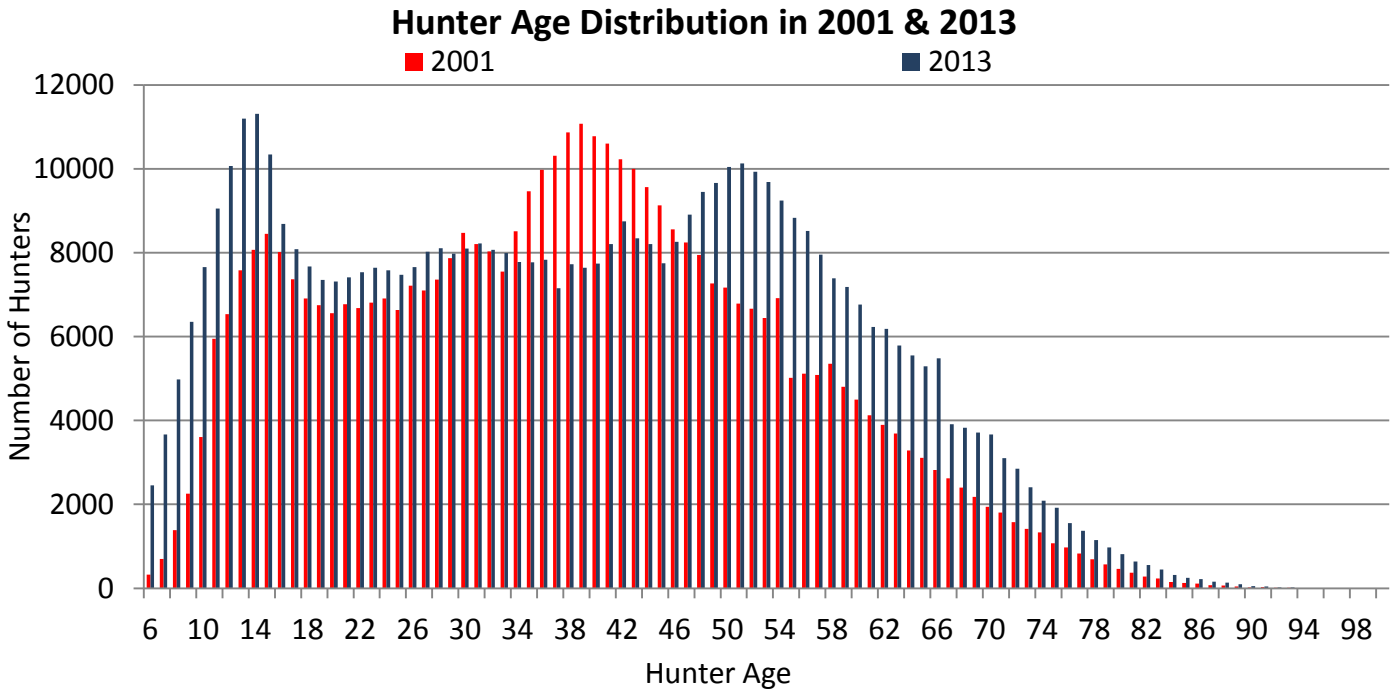
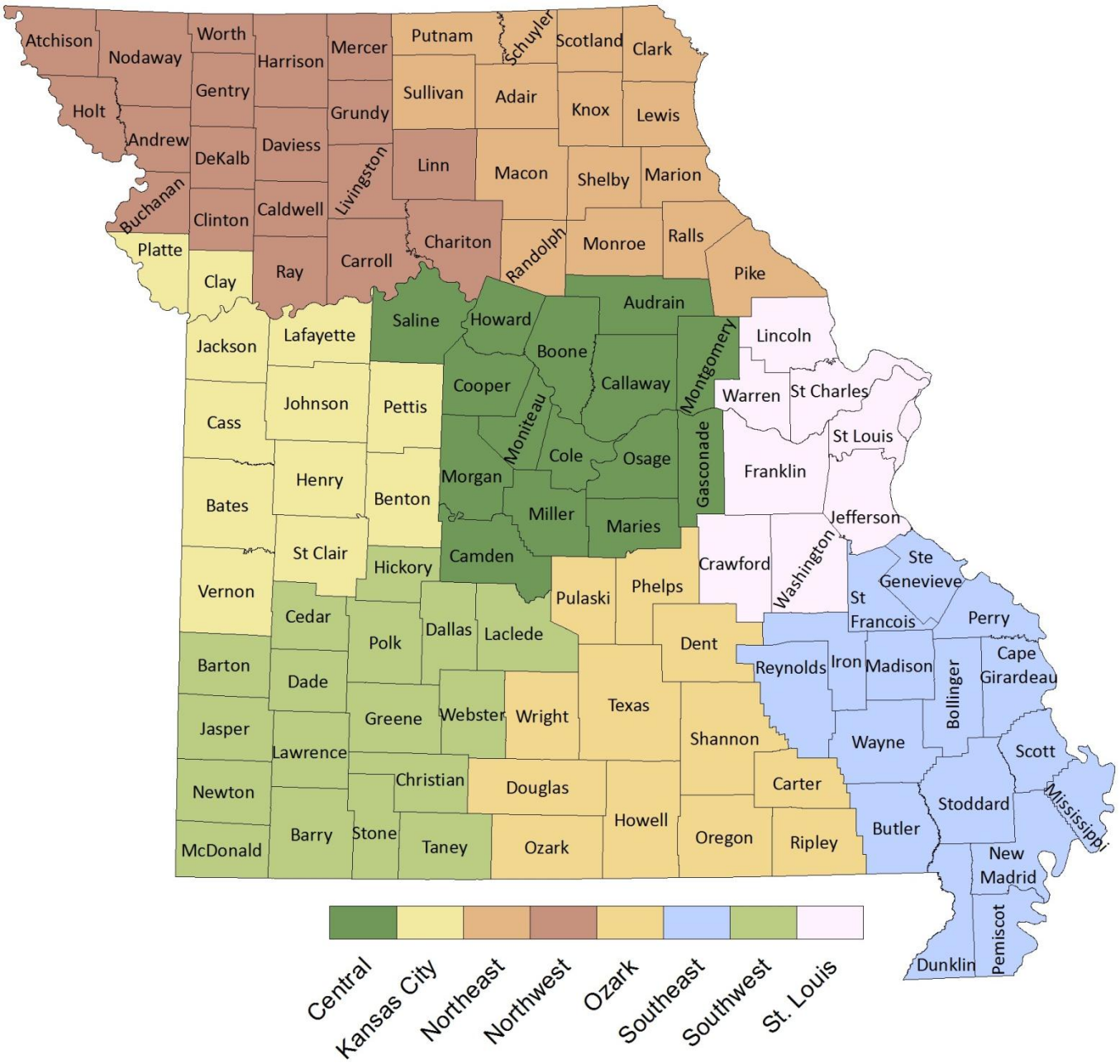


Figure 7. Age distribution of hunters in 2001 and 2013. As the "Baby Boomer" generation ages this portion of the hunting population will continue to decrease.

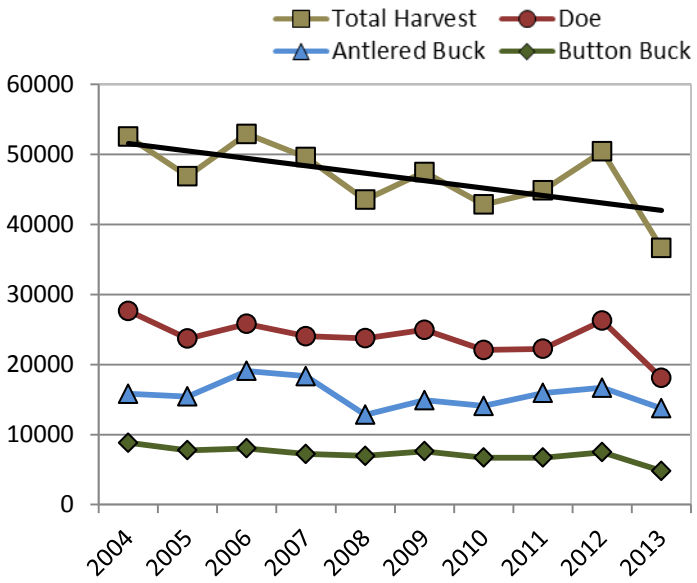
Regional Deer Populations

Statewide deer population trends are important; however, regional deer population trends are more informative to most landowners and hunters. This smaller scale makes deer population trends apparent and the factors influencing populations more easily identified. Although, regional information is more indicative of population trends, it is important to acknowledge that deer populations can vary considerably within a region, and even within a county. Regional and local diversity in deer numbers is a result of differences in land cover and use, harvest regulations, hunter goals and density, and hemorrhagic disease events to name a few. Therefore, regional information should be considered as a starting point when evaluating deer populations within a localized area.



Central Region (Audrain, Boone, Callaway, Camden, Cole, Cooper, Gasconade, Howard, Maries, Miller, Moniteau, Montgomery, Morgan, Osage, Saline)

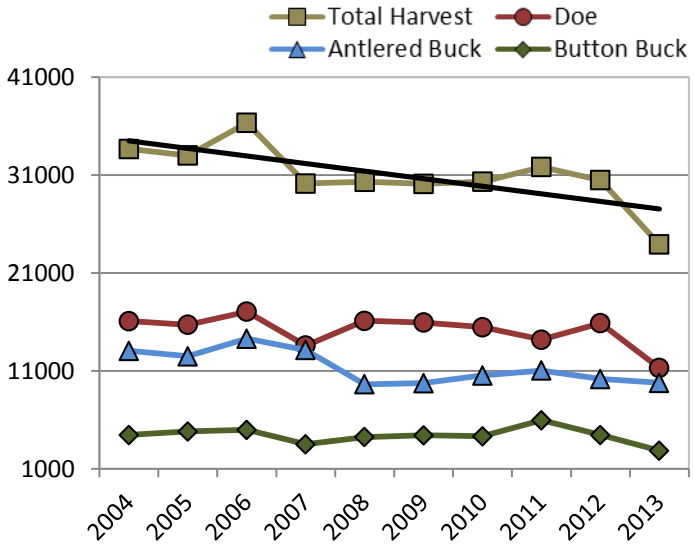
Deer populations vary across the Central Region due to habitat differences and severe hemorrhagic disease events in the past five years. Camden and the northern counties (Audrain, Howard, Boone, Saline, and Callaway) within this region have had significant deer population declines reflected in harvests decreasing by 22-35% over the past 10 years; a result of multiple hemorrhagic disease outbreaks and high doe harvest. The deer harvest decrease of 7-19% compared to the 10-year average in the remaining Central Region counties is partially a result of 2012's hemorrhagic disease outbreak, coupled with high harvest in 2012 due to low acorn production. Public perceptions of deer populations have shifted significantly over the last 10 years in response to changing deer numbers. Firearms antlerless permit availability will be reduced beginning in 2014 for most of this region in an effort to reduce doe harvest to allow populations to stabilize and/or grow to desired population levels.*



Harvest & Survey Info	Stats
# Females Per 1 Male Harvest	1.03
# Trips Per Deer Killed (2012)	7.6

Kansas City Region (Bates, Benton, Cass, Clay, Henry, Jackson, Johnson, Lafayette, Pettis, Platte, St. Clair, Vernon)

Harvest in the Kansas City Region in 2013 was down 23% compared to the 10-year average. This decrease in harvest is a result of long-term high doe harvest and the 2012 hemorrhagic disease outbreak. All counties within the Kansas City Region had a decrease in harvest in 2013 when compared to the 10-year average with Benton, Clay, Henry, Johnson, and Platte having harvest declines of 24% or more. The 32% decline in Benton County was the largest and likely a result of 2012 hemorrhagic disease coupled with high deer harvest in 2012 due to low acorn abundance. This decrease in harvest coupled with production landowner and hunter survey data further validate that population declines have occurred in the Kansas City Region. Therefore, to allow deer populations to stabilize and/or increase to desired population levels, a reduction in firearms antlerless permit availability will occur in 2014 in the rural portions of the this region in an effort to decrease doe harvest. *

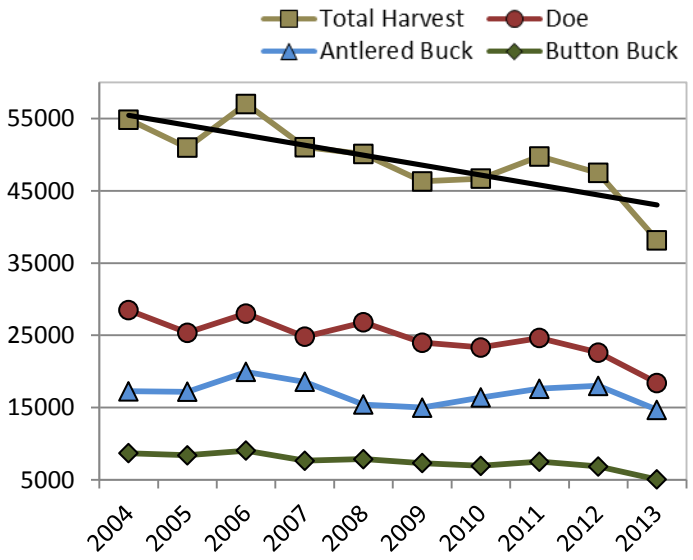


Harvest & Survey Info	Stats
# Females Per 1 Male Harvest	1.12
# Trips Per Deer Killed (2012)	9.4

* Refer to the 2014 Fall Deer & Turkey Regulations Booklet for more information on regulation changes.

Northeast Region (Adair, Clark, Knox, Lewis, Macon, Marion, Monroe, Pike, Putnam, Ralls, Randolph, Schuyler, Scotland, Shelby, Sullivan)

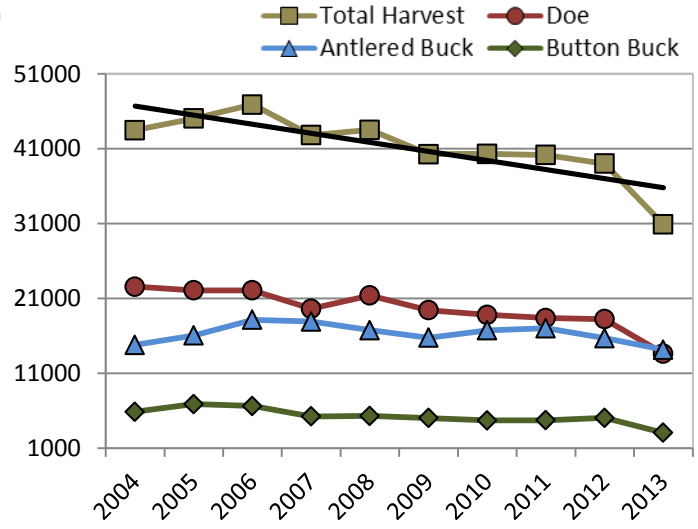
The 2013 deer harvest in the Northeast Region continued the long-term harvest decline with a decrease of 22% from the 10-year average. Many parts of the Northeast Region experienced significant hemorrhagic disease mortality in 2012 and 2013. Therefore, in some counties these repeated hemorrhagic disease events coupled with liberal antlerless harvest opportunities has resulted in deer populations decreasing to below socially acceptable levels. The greatest population declines have occurred in Monroe, Randolph, and Shelby counties where the 2013 harvest decreased by 30% or more compared to the 10-year average. As a result of population declines, firearm antlerless permits will be reduced for the 2014 deer season to one per hunter per county for the majority of counties within the Northeast Region. However, each CWD Containment Zone county will have two firearms antlerless permits available per hunter to balance disease and population management efforts.*



Harvest & Survey Info	Stats
# Females Per 1 Male Harvest	1.07
# Trips Per Deer Killed (2012)	7.8

Northwest Region (Andrew, Atchison, Buchanan, Caldwell, Carroll, Chariton, Clinton, Daviess, DeKalb, Gentry, Grundy, Harrison, Holt, Linn, Livingston, Mercer, Nodaway, Ray, Worth)

The deer population and harvest has been steadily decreasing over the last decade in the Northwest Region. Harvest in 2013 was 25% lower than the 10-yr average. Declining deer populations are a result of liberalized antlerless harvest opportunities, the antler point restriction, and hemorrhagic disease outbreaks. However, significant land use changes in some areas have also reduced the amount of available deer habitat, contributing to deer population reductions. The most significant population reductions are within Atchison, Holt, and Ray counties, where harvest was down 30% to 51% in 2013 compared to the 10-year average. While Worth, Harrison, and Mercer counties have not experienced long-term population declines similar to other counties, harvest was down in 2013 likely as a result of hemorrhagic disease in 2012. To allow populations to increase to or stabilize at socially acceptable levels in many areas, hunters will be limited to one firearms antlerless permit per each Northwest county for the 2014 season, except in Linn and Chariton counties, which will have two to facilitate CWD management efforts.*

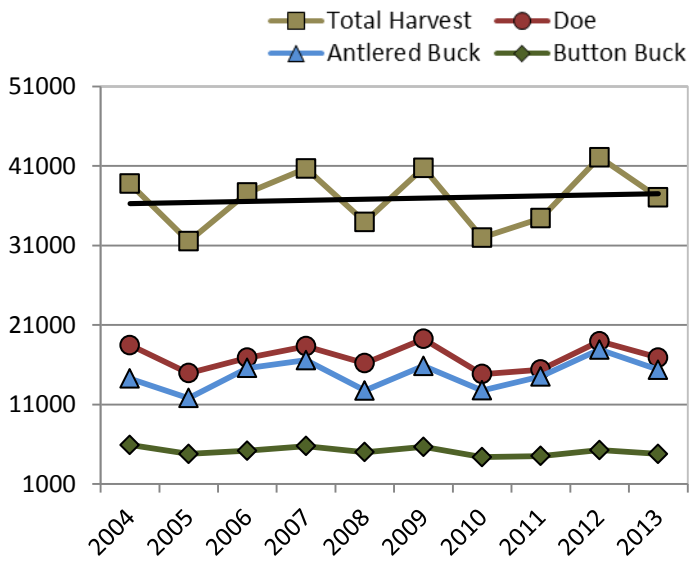


Harvest & Survey Info	Stats
# Females Per 1 Male Harvest	1.26
# Trips Per Deer Killed (2012)	8.4

* Refer to the 2014 Fall Deer & Turkey Regulations Booklet for more information on regulation changes.

Ozark Region (Carter, Dent, Douglas, Howell, Oregon, Ozark, Phelps, Pulaski, Ripley, Shannon, Texas, Wright)

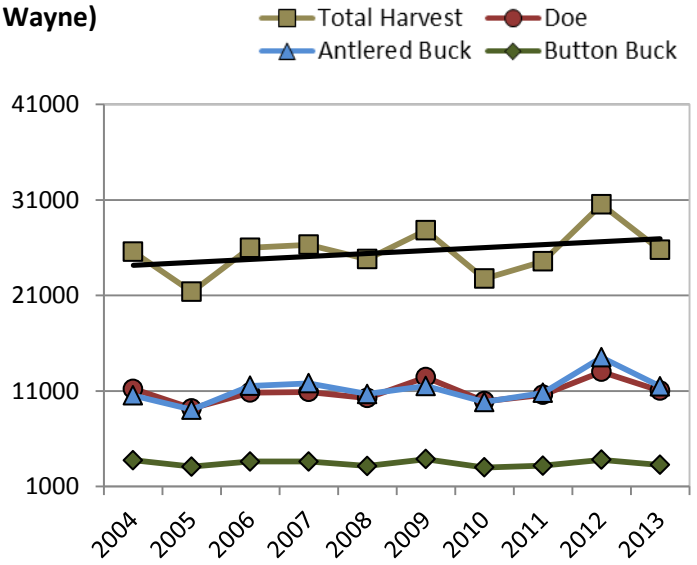
Deer harvest in the Ozark Region was typical of an average acorn production year with harvest similar to the 10-year average. In forest dominated areas like the Ozarks, acorns greatly influence deer harvest by influencing deer movement. For example, low acorn availability results in deer traveling frequently for food and often to fields, increasing deer sightings for hunters, and consequently increasing harvest. However, when acorns are abundant it can cause a decrease in deer harvest, therefore it is important to evaluate several years of harvest to determine trends instead of a single year. For example, harvest was up 22% in 2012, but this was a result of low acorn production and not the result of a large population increase. Generally, the deer population in the Ozark Region has been stable to slowly increasing over the last decade. Carter and Shannon counties had the largest increase in harvest in 2013 compared to the 10-year average with increases of 13% and 12%, respectively. While Wright and Phelps counties had the largest decreases of 17% and 13%, respectively. Stable to slowing increasing deer populations across the Ozarks are generally well accepted because deer populations remain below desirable levels in many areas.



Harvest & Survey Info	Stats
# Females Per 1 Male Harvest	1.19
# Trips Per Deer Killed (2012)	7.5

Southeast Region (Bollinger, Butler, Cape Girardeau, Dunklin, Iron, Madison, Mississippi, New Madrid, Pemiscot, Perry, Reynolds, St. Francois, Ste. Genevieve, Scott, Stoddard, Wayne)

Deer management in the Southeast Region is complex due to differences in habitat, land use, and slowly increasing (yet varying) deer densities, coupled with contrasting stakeholder perceptions of deer population levels. While harvest in the Southeast Region was only up 1% from the 10-year average, it was the only region in 2013 to have an increase in harvest. When comparing the harvest to 2012, the "boot heel" counties were the only counties in the state that had an increase in harvest, a reflection of growing deer populations and minimal influence of acorn production on harvest. Generally, harvest in other Southeast counties was a reflection of a typical acorn crop and slowly increasing deer populations. In response to increasing localized deer-related problems in Cape Girardeau County, there will be one firearms antlerless permit available per hunter in the 2014 deer season. Southeast Region deer populations will be closely monitored and regulation changes will be proposed if needed to maintain populations at desired levels.*

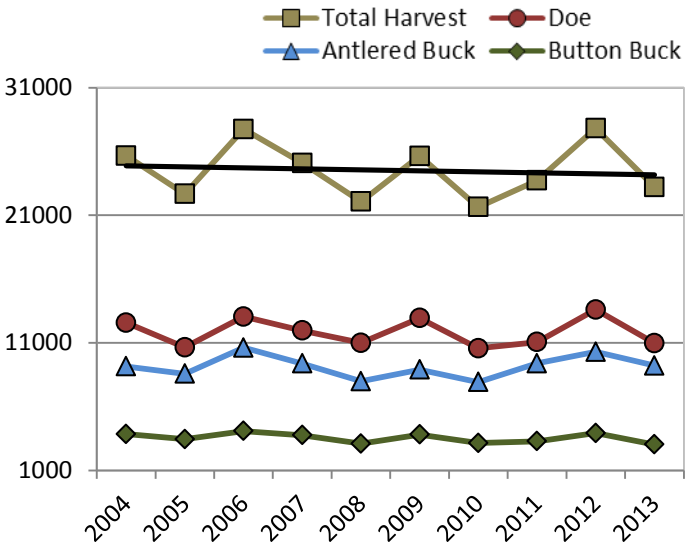


Harvest & Survey Info	Stats
# Females Per 1 Male Harvest	1.33
# Trips Per Deer Killed (2012)	12.1

* Refer to the 2014 Fall Deer & Turkey Regulations Booklet for more information on regulation changes.

St. Louis Region (Crawford, Franklin, Jefferson, Lincoln, St. Charles, St. Louis, Warren, Washington)

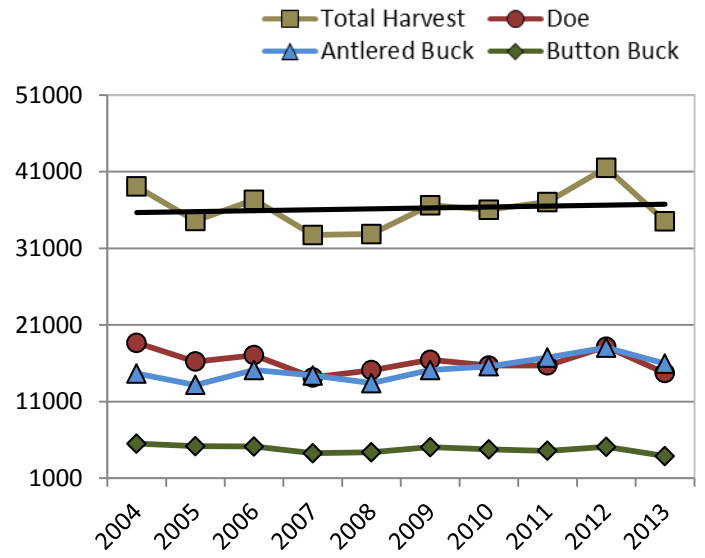
The 2013 deer harvest within rural portions of the St. Louis Region was fairly typical of an average acorn production year with a decrease of only 5% compared to the 10-year average. The greatest change in harvest compared to the 10-year average was a 17% decrease in Lincoln County, which is consistent with long-term decreasing deer populations as a result of liberalized antlerless harvest opportunities and the antler point restriction, coupled with hemorrhagic disease events. Lincoln and Warren counties will go from any number of firearms antlerless permits per hunter to one for the 2014 deer season in response to decreasing deer numbers. Slowly increasing deer populations in the southern portion of the region may warrant some increased antlerless harvest. Therefore, regulation changes will be considered in the next few years, as we will continue to monitor deer populations and collect public feedback. Firearm antlerless permits within the urban zones will be reduced from any number to two, which will still allow urban deer management efforts.*



Harvest & Survey Info	Stats
# Females Per 1 Male Harvest	1.16
# Trips Per Deer Killed (2012)	8.5

Southwest Region (Barry, Barton, Cedar, Christian, Dade, Dallas, Greene, Hickory, Jasper, Laclede, Lawrence, McDonald, Newton, Polk, Stone, Taney, Webster)

The 2013 deer harvest in the Southwest Region was down 5% from the 10-year average, which was a reflection of an average acorn production year, coupled with slowly growing deer populations. Counties that allow one firearm antlerless permit per hunter should continue to allow deer populations to slowly increase. However, Cedar and Hickory counties have experienced population declines as a result of allowing any number of firearms antlerless permits per hunter, which will be reduced to one for the 2014 deer season to allow populations to recover to desired levels. In contrast, Barton County will increase from one to two firearms antlerless permits in response to increased local deer-related issues over the past several years. This will improve the ability of hunters and landowners to manage local deer populations during the hunting season. *



Harvest & Survey Info	Stats
# Females Per 1 Male Harvest	1.35
# Trips Per Deer Killed (2012)	9.6

* Refer to the 2014 Fall Deer & Turkey Regulations Booklet for more information on regulation changes.

County Deer Populations & Trends

The Deer Program annually evaluates a variety of data including deer population information, hunter and landowner surveys, and public input to assess county-specific deer populations. Collectively, this information serves as the foundation for regulation development.

We review two main forms of deer population data: harvest information and population indices. Harvest data includes the total number of deer harvested per county, but also the composition of that harvest (antlered buck, button buck, and doe). Population data includes bowhunter observation indices and population simulations that incorporate harvest numbers, age-at-harvest data, and estimated survival and reproduction rates. Social data is valuable when assessing the deer population in relation to acceptable levels of the public. Statewide, we annually send out surveys to 9,000 production landowners to assess perceptions and attitudes toward deer populations and regulations. Additionally, we survey 35,000 archery hunters and 35,000 firearm hunters, which allows us to estimate hunter effort data (see page 8), hunter density, and opinions concerning deer populations and regulations. We also incorporate public comments received throughout the year via web comments, letters, calls, social media, public meetings, emails, and any other feedback.

The Deer Program annually reviews all this information on a county-by-county basis to classify the status of the deer population and trend (See Figure 8 & 9). When classifying the status of the deer population, we generally evaluate it in the context of acceptable levels of the public. While biological carrying capacity, or the habitat's limitations on the number of deer that can be supported, is included within our assessment, generally cultural carrying capacity will be met first. This is because production landowners, motorists, and other stakeholders will often not tolerate deer population levels at biological carrying capacity. The Deer Program also evaluates the deer population growth trend for each county, as this indicates the direction that the population is headed.

It is critical to acknowledge that deer populations vary within a state, region, and even a county due to variation in habitat, harvest regulations, local hunter goals and practices, hunter density, and disease outbreaks like hemorrhagic disease. Therefore, these assessments are not applicable to every local situation, but are a general representation of trend information for each respective county.

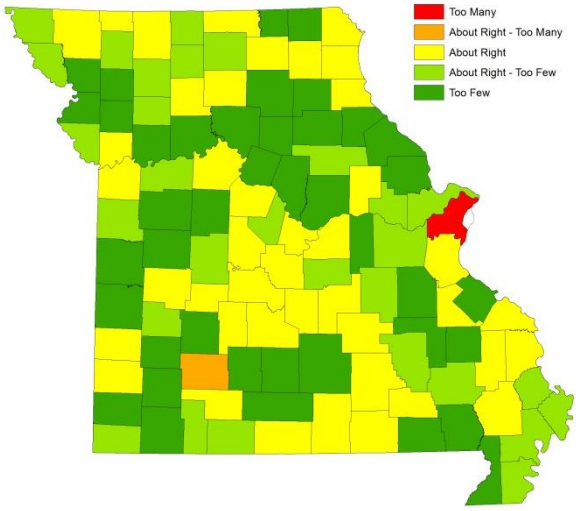


Figure 8. 2013 assessment of county deer population levels in relation to social acceptance of all stakeholders.

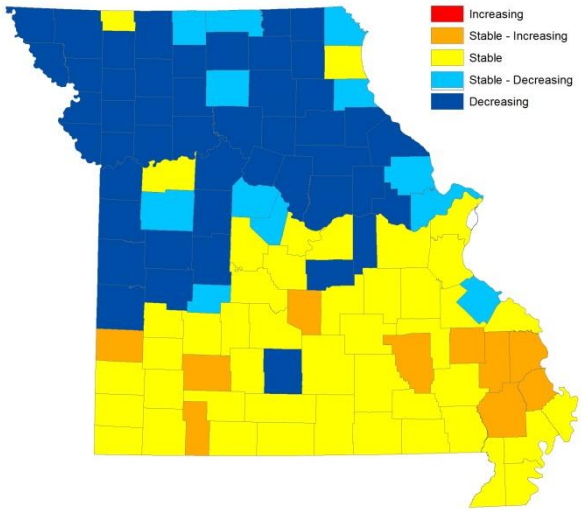


Figure 9. 2013 assessment of county deer population trends.

Table 4. Archery and Firearms Harvest Totals for the 2013-14 Missouri Deer Season.

County	Archery				Firearms				Totals			
	Antlered Buck	Button Buck	Doe	Total	Antlered Buck	Button Buck	Doe	Total	Antlered Buck	Button Buck	Doe	Total
Adair	242	68	326	636	1020	317	1149	2486	1262	385	1475	3122
Andrew	86	21	85	192	509	100	480	1089	595	121	565	1281
Atchison	68	11	68	147	323	47	285	655	391	58	353	802
Audrain	122	39	160	321	515	195	617	1327	637	234	777	1648
Barry	205	55	185	445	740	176	608	1524	945	231	793	1969
Barton	138	27	178	343	613	122	514	1249	751	149	692	1592
Bates	127	15	130	272	614	164	585	1363	741	179	715	1635
Benton	229	67	275	571	992	416	1361	2769	1221	483	1636	3340
Bollinger	254	94	413	761	1112	332	1050	2494	1366	426	1463	3255
Boone	254	75	330	659	739	240	945	1924	993	315	1275	2583
Buchanan	57	14	49	120	314	98	331	743	371	112	380	863
Butler	222	45	202	469	567	169	531	1267	789	214	733	1736
Caldwell	82	10	78	170	528	103	486	1117	610	113	564	1287
Callaway	290	62	397	749	1142	389	1401	2932	1432	451	1798	3681
Camden	257	103	377	737	879	399	1295	2573	1136	502	1672	3310
Cape Girardeau	172	64	282	518	880	178	656	1714	1052	242	938	2232
Carroll	122	28	153	303	803	148	685	1636	925	176	838	1939
Carter	207	59	197	463	778	254	702	1734	985	313	899	2197
Cass	162	26	147	335	602	138	573	1313	764	164	720	1648
Cedar	141	24	212	377	735	245	915	1895	876	269	1127	2272
Chariton	139	28	120	287	833	174	694	1701	972	202	814	1988
Christian	228	39	255	522	647	149	554	1350	875	188	809	1872
Clark	142	58	248	448	702	313	1076	2091	844	371	1324	2539
Clay	206	48	230	484	300	71	259	630	506	119	489	1114
Clinton	63	11	73	147	336	89	304	729	399	100	377	876
Cole	94	33	115	242	446	163	643	1252	540	196	758	1494
Cooper	125	34	173	332	742	222	900	1864	867	256	1073	2196
Crawford	262	89	282	633	1144	332	1092	2568	1406	421	1374	3201
Dade	128	27	79	234	551	109	400	1060	679	136	479	1294
Dallas	198	43	222	463	857	263	880	2000	1055	306	1102	2463
Daviess	133	24	149	306	740	210	926	1876	873	234	1075	2182
Dekalb	41	18	67	126	459	92	412	963	500	110	479	1089

Table 4. Archery and Firearms Harvest Totals for the 2013-14 Missouri Deer Season.

County	Archery				Firearms				Totals			
	Antlered Buck	Button Buck	Doe	Total	Antlered Buck	Button Buck	Doe	Total	Antlered Buck	Button Buck	Doe	Total
Dent	185	63	254	502	1156	363	1204	2723	1341	426	1458	3225
Douglas	183	35	191	409	993	224	758	1975	1176	259	949	2384
Dunklin	53	10	43	106	152	36	117	305	205	46	160	411
Franklin	327	140	572	1039	1437	484	1674	3595	1764	624	2246	4634
Gasconade	181	64	258	503	911	336	1310	2557	1092	400	1568	3060
Gentry	99	13	97	209	599	134	580	1313	698	147	677	1522
Greene	319	73	341	733	722	218	767	1707	1041	291	1108	2440
Grundy	114	22	104	240	514	152	578	1244	628	174	682	1484
Harrison	259	25	250	534	1100	255	990	2345	1359	280	1240	2879
Henry	153	55	250	458	786	282	1039	2107	939	337	1289	2565
Hickory	145	40	184	369	579	275	908	1762	724	315	1092	2131
Holt	93	18	95	206	421	92	330	843	514	110	425	1049
Howard	140	34	190	364	749	169	759	1677	889	203	949	2041
Howell	319	82	373	774	1595	566	1917	4078	1914	648	2290	4852
Iron	79	23	52	154	455	133	323	911	534	156	375	1065
Jackson	348	94	402	844	356	74	323	753	704	168	725	1597
Jasper	282	37	229	548	874	164	569	1607	1156	201	798	2155
Jefferson	404	157	688	1249	1000	367	1278	2645	1404	524	1966	3894
Johnson	158	26	138	322	688	194	736	1618	846	220	874	1940
Knox	181	60	265	506	708	362	996	2066	889	422	1261	2572
Laclede	260	76	282	618	1167	323	1188	2678	1427	399	1470	3296
Lafayette	76	16	87	179	396	151	466	1013	472	167	553	1192
Lawrence	164	31	135	330	568	127	478	1173	732	158	613	1503
Lewis	107	51	187	345	618	340	917	1875	725	391	1104	2220
Lincoln	269	85	327	681	1001	340	1211	2552	1270	425	1538	3233
Linn	269	52	317	638	1062	247	1012	2321	1331	299	1329	2959
Livingston	143	15	130	288	658	170	685	1513	801	185	815	1801
Macon	321	79	376	776	1407	363	1380	3150	1728	442	1756	3926
Madison	127	44	156	327	644	174	472	1290	771	218	628	1617
Maries	137	49	179	365	587	233	786	1606	724	282	965	1971
Marion	122	40	163	325	591	230	836	1657	713	270	999	1982
McDonald	177	29	126	332	662	118	448	1228	839	147	574	1560
Mercer	221	42	245	508	711	208	779	1698	932	250	1024	2206

Table 4. Archery and Firearms Harvest Totals for the 2013-14 Missouri Deer Season.

County	Archery				Firearms				Totals			
	Antlered Buck	Button Buck	Doe	Total	Antlered Buck	Button Buck	Doe	Total	Antlered Buck	Button Buck	Doe	Total
Miller	155	62	216	433	668	356	1054	2078	823	418	1270	2511
Mississippi	33	2	36	71	217	9	55	281	250	11	91	352
Moniteau	72	19	84	175	397	185	586	1168	469	204	670	1343
Monroe	162	42	224	428	783	249	919	1951	945	291	1143	2379
Montgomery	166	37	213	416	831	256	907	1994	997	293	1120	2410
Morgan	201	69	284	554	841	325	1294	2460	1042	394	1578	3014
New Madrid	39	9	52	100	250	24	105	379	289	33	157	479
Newton	317	34	209	560	721	149	571	1441	1038	183	780	2001
Nodaway	176	15	150	341	860	152	802	1814	1036	167	952	2155
Oregon	311	95	396	802	1309	603	2049	3961	1620	698	2445	4763
Osage	258	69	317	644	1139	388	1513	3040	1397	457	1830	3684
Ozark	232	50	224	506	1079	190	918	2187	1311	240	1142	2693
Pemiscot	18	5	22	45	84	12	50	146	102	17	72	191
Perry	115	43	176	334	931	246	959	2136	1046	289	1135	2470
Pettis	153	20	190	363	701	204	859	1764	854	224	1049	2127
Phelps	167	51	257	475	696	308	897	1901	863	359	1154	2376
Pike	260	72	314	646	1078	371	1444	2893	1338	443	1758	3539
Platte	177	32	270	479	378	57	303	738	555	89	573	1217
Polk	178	31	178	387	788	170	601	1559	966	201	779	1946
Pulaski	182	76	271	529	581	192	641	1414	763	268	912	1943
Putnam	267	47	303	617	859	257	926	2042	1126	304	1229	2659
Ralls	129	38	170	337	624	245	849	1718	753	283	1019	2055
Randolph	149	23	128	300	793	196	744	1733	942	219	872	2033
Ray	104	18	105	227	605	130	557	1292	709	148	662	1519
Reynolds	136	37	125	298	702	252	597	1551	838	289	722	1849
Ripley	254	94	272	620	952	354	1244	2550	1206	448	1516	3170
Saint Charles	257	50	242	549	640	160	634	1434	897	210	876	1983
Saint Clair	189	66	249	504	940	353	1342	2635	1129	419	1591	3139
Saint Francois	163	44	196	403	651	209	622	1482	814	253	818	1885
Saint Louis	362	157	657	1176	333	70	367	770	695	227	1024	1946
Sainte Genevieve	108	45	232	385	799	216	900	1915	907	261	1132	2300
Saline	100	23	126	249	595	184	659	1438	695	207	785	1687
Schuyler	83	33	119	235	401	223	647	1271	484	256	766	1506

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County	Archery				Firearms				Totals			
	Antlered Buck	Button Buck	Doe	Total	Antlered Buck	Button Buck	Doe	Total	Antlered Buck	Button Buck	Doe	Total
Scotland	193	62	245	500	725	320	1009	2054	918	382	1254	2554
Scott	63	9	66	138	289	52	200	541	352	61	266	679
Shannon	149	61	189	399	1003	336	1181	2520	1152	397	1370	2919
Shelby	150	56	221	427	648	241	927	1816	798	297	1148	2243
Stoddard	214	72	233	519	527	197	567	1291	741	269	800	1810
Stone	168	33	171	372	579	136	403	1118	747	169	574	1490
Sullivan	241	49	276	566	984	257	1022	2263	1225	306	1298	2829
Taney	225	51	238	514	859	218	798	1875	1084	269	1036	2389
Texas	278	88	353	719	1795	442	1654	3891	2073	530	2007	4610
Vernon	179	53	215	447	868	222	861	1951	1047	275	1076	2398
Warren	194	63	245	502	652	231	759	1642	846	294	1004	2144
Washington	152	59	204	415	774	245	737	1756	926	304	941	2171
Wayne	289	127	392	808	1138	352	1150	2640	1427	479	1542	3448
Webster	189	53	204	446	816	206	686	1708	1005	259	890	2154
Worth	120	4	94	218	392	80	310	782	512	84	404	1000
Wright	179	39	187	405	787	149	566	1502	966	188	753	1907
Central	2552	772	3419	6743	11181	4040	14669	29890	13733	4812	18088	36633
Kansas City	2157	518	2583	5258	7621	2326	8707	18654	9778	2844	11290	23912
Northeast	2749	778	3565	7092	11941	4284	14841	31066	14690	5062	18406	38158
Northwest	2389	389	2429	5207	11767	2681	11226	25674	14156	3070	13655	30881
Ozark	2646	793	3164	6603	12724	3981	13731	30436	15370	4774	16895	37039
Southeast	2085	673	2678	5436	9398	2591	8354	20343	11483	3264	11032	25779
Southwest	3462	703	3428	7593	12478	3168	11288	26934	15940	3871	14716	34527
St. Louis	2227	800	3217	6244	6981	2229	7752	16962	9208	3029	10969	23206
GRAND TOTAL	20267	5426	24483	50176	84091	25300	90568	199959	104358	30726	115051	250135

Deer Management "Tool Box"

It is important to understand how harvest regulations are used as "tools" to manipulate deer populations in order to balance deer populations at desired levels that are socially acceptable to all stakeholders and below biological carrying capacity. Although all deer harvest regulations influence harvest in some form, the impacts on the deer population are dependent on several factors. Deer populations grow or decline based on mortality and reproduction rates or the number of deer that die and are born annually. Because does directly influence population growth through reproduction, deer populations are driven by doe harvest. Although other sources of mortality can influence population growth including hemorrhagic disease and vehicle collisions, harvest drives deer populations in rural Missouri.

Antlerless Permits

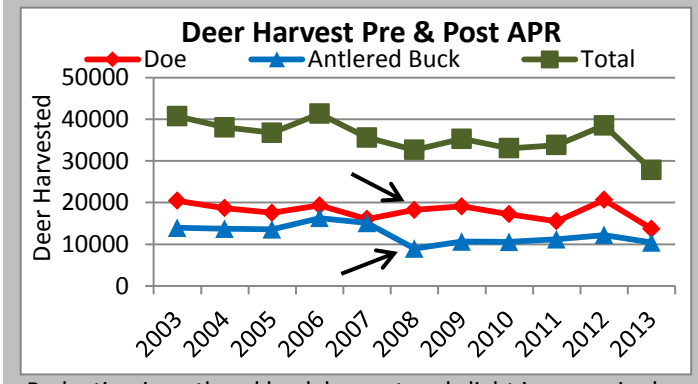
In many areas of Missouri it is firearms antlerless harvest that is the driving factor of population growth. Statewide, 78% of all antlerless harvest occurs within the firearms season, with nearly 60% in the November portion alone. Also, over 60% of all deer taken on antlerless permits are taken on permittee firearm antlerless permits (not including landowner permits). Therefore, manipulating the number of firearms antlerless permits is an excellent "tool" to influence antlerless harvest, thus affecting population trends. While only a small portion of hunters harvest more than one antlerless deer annually, limiting the number of firearms antlerless permits per hunter will have population impacts over a few years and can have local impacts even earlier. However, it is important to view deer management not with annual goals, but instead long-term goals, because dramatic shifts in harvest result in more frequent and complicated regulation changes and frustrated stakeholders. Also, limiting the availability of firearms antlerless permits should help communicate the impacts of doe harvest on deer populations trends.

Antlerless Portion

Extending the hunting season, or having additional hunting days, does not always result in a higher harvest. Often hunters harvest the same number of deer once the days available to hunt reaches a certain limit. While a difference of a 2-day season versus a 10-day season will influence harvest totals, a 10-day season versus a 20-day season often does not result in a huge difference in harvest.

Antler Point Restriction

The primary goal of the antler point restriction (APR) was to lower deer densities by shifting harvest from bucks to doe there by increasing doe harvest. Reduced buck harvest which produced better buck age structure was a secondary benefit. The two might seem unrelated, but often hunters resort to harvesting a doe when they have to pass on young bucks that do not meet the APR.



Reduction in antlered buck harvest and slight increase in doe harvest because of implementing APR in 2008.

Other Regulations

When regulations have social impacts on hunting, thus affecting "how we hunt" there can be less intuitive population impacts. For example, a one buck annual limit (regardless of method) may decrease antlerless harvest because hunting activity may decrease once an individual fills their buck limit.

Deer Management Information

Deer Hunters are Deer Managers

Nearly every decision made by hunters and landowners in the field can influence the local deer population. This can range from choosing to harvest a deer, granting hunting access to your property, implementing habitat practices and so on. Sometimes what appear as simple decisions can have great impacts on population growth, adult sex ratio, and buck age structure. Too often hunters and landowners become frustrated with deer population trends, and do not realize their actions may be contributing to their frustration. Therefore, it is important to understand how deer harvest and habitat management can influence local deer populations to help achieve local deer management goals. Refer to *Deer Info for Hunters* section below for more information.

Successful archery hunt in Osage County, Missouri

Deer Cooperatives

Cooperatives, or coops, are not a new concept, as it is simply a group of landowners or hunters working together to improve the wildlife and habitat. In Missouri, coops focusing on deer management goals are becoming increasingly popular.

Deer can have home ranges over 1,000 acres, therefore, most local deer populations are influenced by several landowners and hunters. By working together, there is a greater chance of achieving shared deer management goals.

If you are interested in forming a cooperative or would like to learn more, contact Emily Flinn, MDC Deer Biologist, by calling (573)815-7901 ext-3619 or emailing emily.flinn@mdc.mo.gov

Deer Information for Hunters & Landowners

The University of Missouri (MU) Extension and Missouri Department of Conservation collaborated on a publication series devoted solely to deer management. This information was intended for landowners, hunters, and wildlife enthusiasts that want to learn more about deer and managing deer in Missouri.

There are seventeen science-based deer handouts that will guide landowners and hunters to better understanding and managing deer populations. Several publications explain how to obtain population information, such as sex ratio, density, fawn recruitment, and age structure. Topics also include habitat management and deer biology, including antler growth, ecology, and aging deer by jawbones.

These publications are free and available on MU Extension's website: **http://extension.missouri.edu/deer**

Chronic Wasting Disease

Chronic wasting disease (CWD) belongs to a group of diseases known as transmissible spongiform encephalopathies (TSEs) which cause the brain to deteriorate in cervids such as deer, elk, and moose. CWD is always fatal, but can take months or years before symptoms appear, which can include changes in behavior, extreme weight loss, excessive salivation, stumbling, and tremors. During the period between infection and clinical signs, infected cervids can spread CWD by contacting other cervids and via excrements (e.g., feces, urine, and saliva) in the environment. CWD is also spread through the natural movements of infected cervids and movement of infected captive cervids. Since infected carcasses can also spread the prion, indirect transmission may occur through carcass movement by hunters. To determine if a cervid is CWD-positive, a laboratory test of the brain stem or lymph node tissue is required.

Current research indicates that CWD cannot be spread to domestic livestock, such as sheep or cattle. Also, the Center for Disease Control (CDC) has found no evidence that CWD can infect people. While there is no scientific evidence that CWD is transmissible to humans or animals other than deer and other cervids, health officials do not recommend the consumption of the parts (brain, spinal cord, eyes, spleen, and lymph nodes) where the prions accumulate.

CWD in Missouri: Update

Missouri's first cases of CWD were detected in 2010 and 2011 in captive deer at private big-game hunting preserves in Linn and Macon counties. In January of 2012, the first free-ranging CWD-positive deer were detected in Macon County through the sampling of two hunter-harvested deer. MDC implemented several management actions to help limit the spread and prevalence of the disease within the CWD Containment Zone (Adair, Chariton, Linn, Macon, Randolph, and Sullivan counties) including the removal of the antler point restriction, banning feeding/consumable attractants of deer, and discouraging the transport of cervid carcasses. The Antler-Point Restriction (APR) was removed because it protects yearling males and promotes an older age structure in bucks, which often have higher infection rates than females. Also, the dispersal of yearling males from their birth area in search of new territory is one of the primary means of CWD spread across the landscape. Additionally, the placement of feed, minerals, and other consumable deer attractants were prohibited because activities that artificially concentrate deer increases the likelihood of disease transmission from animal to animal or soil to animal. In addition to statewide routine sampling, MDC increased efforts to sample hunter harvested deer in the Containment Zone and implemented targeted culling in the 30-square mile Core Area to increase testing and reduce deer densities.

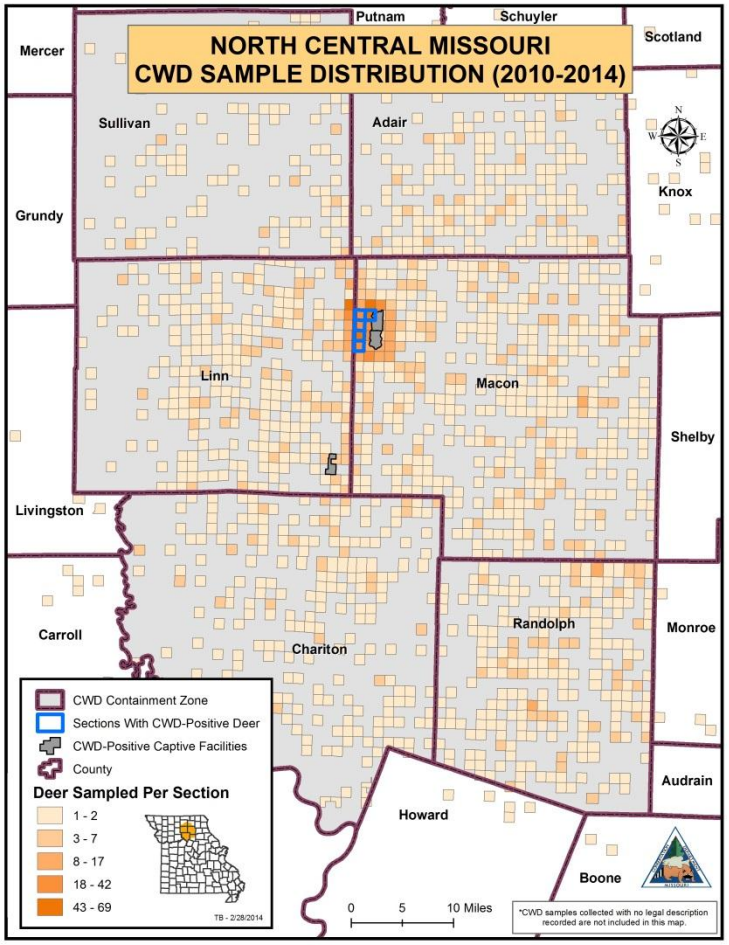


Figure 10. CWD sample distribution within the Containment Zone and sections where free-ranging CWD-positive deer have been

In total MDC has tested more than 40,000 free-ranging deer for CWD from all Missouri counties since 2002. As of spring 2014, CWD has been confirmed in 11 captive deer and 10 free-ranging deer within two miles of a CWD-positive captive facility in Macon County.

Hemorrhagic Disease

Hemorrhagic disease (HD), which includes both the EHD and bluetongue viruses, is spread by midges (biting "no-see-um" flies) and is completely unrelated to chronic wasting disease (CWD) as described on page 21. Most deer infected with HD in Missouri die within two weeks. Once infected, but before death, deer may exhibit the following symptoms: disorientation, lack of natural fear of humans, foaming at the mouth and/or nose, high fever, and swollen jaw. While a small portion of Missouri deer survive the HD virus, they may die weeks to months later due to secondary infections. However, some deer can survive HD completely with the only residual symptom being sloughed hooves, often noticed during the hunting season. These viruses do not affect humans or non-ruminant animals like dogs and cats. While infrequent, HD viruses can infect and cause symptoms in some domestic livestock species, including cattle and sheep.

Foaming at the mouth and nose is a typical symptom of hemorrhagic disease.

Summers with high temperatures and drought conditions can intensify an HD outbreak, as was the case in 2012 in Missouri. This is because the midges that carry the virus breed around mud flats, which become more prevalent during hot, dry summers. Additionally, deer visit these increasingly diminishing water sources more frequently during these extreme conditions, increasing their potential exposure to the midges. Once infected, deer often develop a high fever and seek out water sources, often dying in close proximity to water. Deer that die due to HD do not pose a threat to the further spread of HD.

HD outbreaks often are localized, meaning they can significantly affect a small area, but another area within the same county might not have any mortality. Therefore, it is nearly impossible to estimate HD mortality rates until a few years after an outbreak when harvest data can reveal the impact. Reports made by the public concerning deer with symptoms of HD are very valuable in determining where an outbreak has occurred and the general severity, but unfortunately are not sufficient for estimating mortality rate. Therefore, if landowners and hunters notice a decline in deer sightings or have found carcasses suggesting HD mortality, they should consider harvesting fewer does to allow the population to recover.

Deer infected with HD are often uncoordinated, therefore are unable to stand or walk.

Often noticed by hunters, sloughed hooves are a classic residual symptom of hemorrhagic disease.

Deer Program Research Projects

Research projects produce important information that is incorporated into management decisions on scales ranging from local levels to statewide, and are consequently essential to the Deer Program's abilty to manage for a sustainable, healthy deer herd at desired population levels for all stakeholders. The following research projects will have broad and diverse application to deer management in Missouri.

Hunting Regulation Effects on Hunter Perceptions and Deer Populations on Conservation Areas

Recently, we completed a research project to track changes in deer and hunter numbers and measure hunter attitudes toward deer hunting regulations on conservation areas.

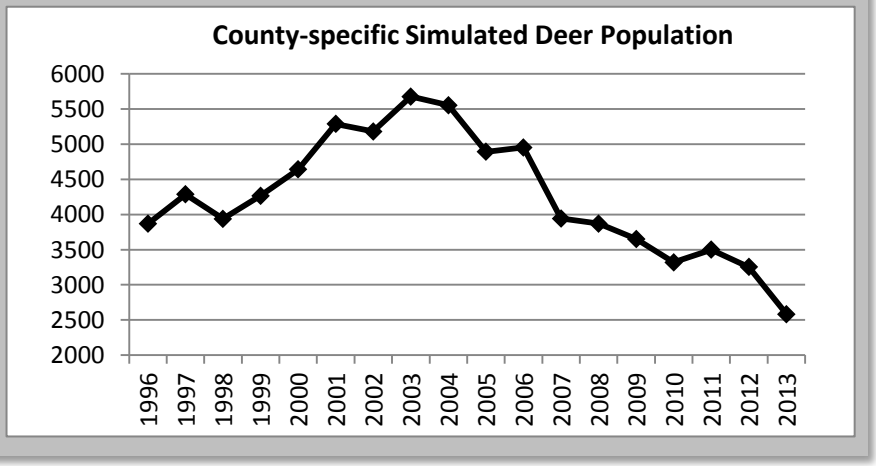
Study results indicate that good total deer numbers, good buck numbers, and satisfaction with deer hunting regulations were the most important factors affecting hunter selection of an area. Other factors, such as being close to home, having a tradition for hunting an area, and camping opportunities were less important overall but their importance varied depending on the area deer hunting regulation. Participants were more satisfied with the number of deer, the regulations, and the hunting experience on Archery Methods Only and Archery & Muzzleloader Methods Only areas and least satisfied on Statewide regulation areas. Respondents hunting Archery Methods and Archery & Muzzleloader Methods areas were most likely to return to the same area to hunt deer the following year.

This is confirmation that for most hunters the opportunities to see and harvest deer are important and affect selection of an area to hunt and their overall hunting satisfaction. In general, areas with more restrictive regulations produce better opportunities to see deer and more satisfied hunters. However, for some hunters the opportunity to go deer hunting and use whatever permits are available in the county is most important. Therefore, it is important for MDC to provide a diversity of hunting opportunities on conservation areas.

Investigating a New Method for Modeling Deer Populations in Missouri

In collaboration with the University of Missouri and the University of Washington, MDC is investigating a new method of modeling deer populations in Missouri called Statistical Population Reconstruction (SPR). This is an exciting endeavor for the MDC Deer Program because population models are an important component when assessing deer populations, considering regulation changes, and determining the impacts of potential regulations. This new method provides several improvements over current population models that will increase the model's accuracy, strengthening the foundation for monitoring regional and county-specific deer populations.

This modeling approach uses a variety of data that MDC currently collects including age at harvest information, hunter effort, and harvest data, and some additional information that will be collected in future deer research projects. Missouri will be the first state to implement SPR on a statewide basis for any animal, but specifically for deer and turkey.



Modeling Chronic Wasting Disease Dynamics and Impacts on White-tailed Deer in Missouri

In collaboration with the University of Missouri, MDC has implemented a research project to model CWD distribution and potential impacts on Missouri's deer population. In north-central Missouri where CWD has been detected, we plan to model distribution and prevalence of CWD currently and in the future given various scenarios. This will allow us to model potential impacts of CWD on the deer herd, including survival and abundance. Additionally this information may provide insight on management adjustments that could facilitate a reduction in CWD distribution and prevalence.

CWD is a fatal neurological disease that poses a serious long-term threat to the health of the free-ranging deer population.

In addition to the application to north-central Missouri, this study will allow us to develop predictions and management strategies in the event that CWD is introduced to another location in the state. It will allow comparisons of various impacts management practices may have on CWD prevalence and distribution. Also, the study will provide the ability to compare various monitoring strategies, thus increase our ability to detect CWD early so that management efforts can be effective, while ensuring the efficient use of resources.

Survival, Recruitment, and Movement Patterns of White-tailed Deer in Missouri

The MDC has proposed a study in collaboration with the University of Missouri to evaluate survival, recruitment, and movement patterns of deer in two different regions of Missouri. This information will enhance the Deer Program's ability to estimate populations and guide disease management protocols, and provide hunters and landowners with valuable management information.

Over the past 20+ years landscape level changes in habitat condition, deer densities, harvest vulnerability, hunter selectivity, and predator populations have resulted in unknown changes in white-tailed deer survival, thus potentially affecting MDC's ability to accurately estimate deer populations. The information generated will contribute to population models accurately reflecting current deer populations and guiding harvest regulation recommendations and management decisions.

Additionally, movement information derived from the study will be incorporated into current and future disease management plans. Movement patterns (i.e., dispersal distance and home range size) affect the spread and spatial distribution of diseases, including CWD and bovine tuberculosis. This research project will provide regional information on deer movement patterns for use in developing disease management strategies, thus increasing MDC's and Missouri citizens' confidence that disease management actions are being implemented on an appropriate scale to be effective and yield desired results.

Missouri Department of Conservation